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COMMUNICATION

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Sir:


Applicants submit a certified English translation of European Patent Application No. 02447130.2 that was filed in 10 July 2002 on which priority is claimed. Applicants claimed priority of this application in their Declaration.

It is believed that no fee is due. If, however, a fee is required, the Assistant Commissioner is authorized to charge such fee, or credit any overpayment to Deposit Account No. 50-0320.

It is respectfully requested that receipt be acknowledged of this priority document.

Respectfully submitted,

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Patentanmeldung Nr. Patent application No. Demande de brevet n°

02447130.2

Der Präsident des Europäischen Patentamts;
Im Auftrag

For the President of the European Patent Office

Le Président de l'Office européen des brevets
p.o.

R C van Dijk



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Bezeichnung der Erfindung/Title of the invention/Titre de l'invention:
(Falls die Bezeichnung der Erfindung nicht angegeben ist, siehe Beschreibung.
If no title is shown please refer to the description.
Si aucun titre n'est indiqué se référer à la description.)

Tyre track

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"Tyre track"

The present invention relates to a monolithic flexible track aimed at being used for converting a wheeled vehicle into a tracked
5 vehicle. The term monolithic is used herein by opposition of a track composed of a plurality of connected rigid elements extending in cross direction of the length of the track.

A large number of solutions have been proposed in the past for providing wheeled vehicles with monolithic flexible tracks which can
10 be installed on pairs of wheels remote from each other on the same side of a vehicle, the said wheels, or at least one of them being a driven wheel. Usually, such tracks are reinforced in longitudinal direction with different material such as steel or textile fibbers or cords.

Namely, GB 2 104 015 discloses such a flexible track of
15 elastomeric material reinforced with nylon or steel filamentary material which can take the form of a continuous cord of the material wound in a plurality of side-by-side turns across the width of the track. The disclosed endless track is continuous and requires that the tires of the vehicle be deflated for mounting the said track on wheels of the vehicle. This
20 operation is complicated and time consuming, since it imposes usually to elevate the vehicle in order to allow disposing the track around successive wheels, to force the track under the deflated tires when the vehicle is not elevated or to dismount wheels to engage the said track. Of course, the complementary operation of removal of the track from vehicle
25 wheels presents the same disadvantages.

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It has alternatively been proposed by US 4 362 340 to provide a monolithic flexible track that can readily be arranged on, or removed from a vehicle. The disclosed track is thus non continuous and is composed of flexible material reinforced with a liner of nylon, canvas or the like, embedded in the track. Near its two ends, the track is provided with a rim which is milled so that the said two ends interengage. The milled end rims are formed by alternating rectangular extensions and cavities. Each extension has a hole in the flexible material in which a tubing section is fastened. When the ends of the track are connected together the tubing sections form a substantially uninterrupted channel through which a steel rod passes, aimed at fastening the ends of the track in view of constituting an endless belt around the vehicle wheels.

Such a non continuous flexible track enables an easy mounting on vehicle wheels since the vehicle only needs to drive on the track before fastening its ends together around the said wheels.

However, in operation of the track on the vehicle wheels, especially when the latter has to drive in heavy ground conditions, the connection of the ends of the track are subjected to high tension stresses, involving the appearance of cracks in the width of the track, on the sides of the channel comprising the aforementioned tubing sections. These cracks will weaken the solidity of the track and could even lead to its breakage with the consecutive danger for the driver of the vehicle or persons being present near the latter.

The present invention affords a solution to this problem in ensuring that a passage constituted at each of the ends of the track for receiving a means for maintaining connected the said ends is reinforced by the reinforcement material embedded in the track.

Therefore, the invention provides a flexible track for converting a wheeled vehicle into a track vehicle, comprising a band of elastomeric material having a first and a second extremity and reinforced with at least one flexible elongated reinforcing element embedded in the

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band and extending along the length of the said band, the said first and second extremities being respectively provided with at least one hole extending in cross direction of the length of the band and forming a passage for receiving a means for connecting the said first extremity to
5 the said second extremity, for forming an endless track, the at least one reinforcing element forming a loop around the at least one hole at each of the said first and second extremities of the band.

Due to the presence of a loop of the flexible elongated reinforcing element around at least one hole at each extremity of the band of
10 elastomeric material, the tension stresses that can be endured at the junction of the extremities of the track in operation of the track on the vehicle wheels will be absorbed by the said flexible elongated reinforcing element thus avoiding formation of cracks in the band of elastomeric material at the sides of the passage receiving the means for connecting
15 the two extremities of the said band.

Suitably, the band comprises opposed first and second lateral longitudinal sides and each reinforcing element extends continuously from one lateral side of the said band to the opposite lateral side of the said band in making alternate loops around each said hole of each of the
20 first and second extremities of the said band. Such a configuration of the invention provides the track with an homogeneous traction resistance, especially at its extremities, since each passage for receiving a means for maintaining connected the extremities of the track will be properly reinforced.

25 Preferably, each reinforcing element comprises a first and a second extremity, each of the latter being secured to the said reinforcing element to form one said loop. This configuration affords an additional reinforcement of the extremities of the track.

It is also preferred that the said reinforcing element comprises at
30 least one metal or textile cord or strip. Such material have the advantage of having a high tension resistance and a high flexibility.

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More preferably, the said reinforcing element is composed of a steel cord strip embedded in an elastomeric material coating. Such a reinforcing element is comprised of steel cords disposed adjacent to each other and embedded in the said elastomeric material coating.

5 In a preferred embodiment of the invention, the said first and second extremity of the band is provided with alternating extensions and recesses, each extension being provided with at least one said hole, each extension of the first extremity being aimed at engaging a corresponding recess of the second extremity and each extension of the
10 second extremity being aimed at engaging a corresponding recess of the first extremity, for forming across the width of the band, a channel with a plurality of successive holes for receiving the said means for connecting the said first and second extremities of the band. This embodiment enables a very simple means for maintaining connected the extremities
15 of the band to be used, affords a strong bond to the latter and an outstanding continuity of the track once mounted on wheels of a vehicle.

 It is preferred that each of said hole is provided with a rigid tubing section. This ensures that passage for receiving the means for maintaining connected the extremities of the band conserves its shape
20 even when the said extremities are submitted to high tension forces.

 Suitably, the said means for connecting the said first and second extremities of the band comprises at least one rigid or flexible elongated member having a length corresponding to the width of the said band and having a cross section adapted for passing through each said hole. This
25 enables a fast and easy connection of the said extremities.

 In another embodiment of the invention, the band further comprises rigid or flexible reinforcing elements disposed across the length of the band. This provides the said band with an improved transverse stability and resistance to impact damages that is suitable
30 when the vehicle on which the track according to the invention is mounted has to progress in heavy and highly irregular ground conditions.

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Possibly, the flexible track according to the invention further comprises at least one intermediary piece being removably connectible at the said first and second extremities of the band in view of modifying the length of the track. This enables the said track to be adapted to
5 nearly any configuration of wheeled vehicles.

Preferably, the inner face of the band aimed at contacting the wheels of a vehicle is provided with traction ribs disposed so that to engage corresponding recesses in the said vehicle wheels. Such traction ribs afford an increased transmission efficiency of the movement of the
10 wheels of the vehicle to the track. Therefore, the tension of the track on the said wheels can be lowered which is beneficial to the transmission of the power of the engine on the ground through the tracked wheels.

Also preferably, a plurality of guiding wings are disposed at a distance from each other along the said first and second lateral sides of
15 the band and protruding from the latter so as forming a channel aimed at engaging lateral sides of the said vehicle wheels. Such guiding wings prevent detracking of the track from the wheel of the vehicle when used in extreme conditions.

Preferably, the guiding wings are arranged to exert a
20 clamping force on the lateral sides of the vehicle wheels. They then also afford an increased transmission efficiency of the movement of the wheels of the vehicle to the track, as with aforementioned traction ribs.

The said guiding wings can be used alone or in combination with traction ribs. When used alone, guiding wings enable any kind of
25 design of the tires of the wheels of the vehicle to be used, provided the width of the said tires is adapted to that of the track, whereas traction ribs require tire design to be adapted to the shape and position of the said ribs.

Guiding wings can be made of the same flexible material as
30 that used for the band of the track according to the invention. Each guiding wing may in addition be reinforced with a rigid core, for example

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made of steel or any other suitable material, such a rigid core being preferably composed of two substantially orthogonal portions, one of them extending within the width of the band and the other within a guiding wing.

5

The invention will now be further detailed without limiting the scope of the invention, with reference to the attached drawings in which :

Figure 1 represents a partially exploded perspective view of a portion of a track according to the invention mounted on a wheel of a vehicle.

Figure 2a represents a perspective view of a flexible elongated reinforcing element of a track according to the invention.

Figure 2b represents a perspective view of a loop formed by a flexible elongated element according to the invention.

Figure 2c represents a front section view of the flexible elongated reinforcing element according to the invention.

Figure 3 represents a perspective view of a portion of a track according to the invention in a position in which the extremities of the band of the track are connected.

Figure 4 represents a top view of a portion of a track according to the invention.

Referring to figure 1, there is shown a portion of a flexible track 1 according to the invention, mounted on a tyre 12 of a wheel of a wheeled vehicle (not shown). The track comprises a band 5 of elastomeric material in which is embedded a reinforcing element 7 consisting in a steel cord strip embedded in an elastomeric material coating. The reinforcing element 7 extends along the length of the track 1. The track further comprises flexible reinforcing elements 11 disposed across the length of the band 5 and guiding wings 4 made of the same

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material as the band 5 and protruding from the latter. The Guiding wings 4 are aimed at engaging the lateral sides of the vehicle wheel and at exerting a clamping force on the said sides. Each guiding wing 4 is reinforced with a rigid core 6 made of steel and composed of two substantially orthogonal portions, one of them (not shown) extending within the width of the band.

In figure 2a there is shown the flexible elongated reinforcing element 7 consisting of a steelcord strip embedded in an elastomeric material layer, before the said element 7 is embedded within the band (not shown) of the flexible track according to the invention. The flexible elongated reinforcing element 7 extends continuously from one lateral side of the band to the opposite lateral side of the latter in making alternate loops around rigid tubing sections 9 in view of delimiting holes 14 at the extremities of the band, said holes extending in cross direction of the length of said band for forming a passage for receiving a means (not shown) for connecting the said extremities of the band (not shown). The extremities 8 of the reinforcing element 7 are secured to the latter to form one of said loop.

Figure 2b shows a loop made by the flexible elongated reinforcing element 7 around a rigid tubing section 9 delimiting a hole 14 for the passage of a means (not shown) for connecting the extremities of the band (not shown).

Figure 2c shows in front section a the flexible elongated reinforcing element 7 comprising a steelcord strip 16 embedded in an elastomeric material coating 17.

Figure 3 shows a portion of a flexible track 1 according to the invention comprising a band 5 of elastomeric material whose extremities are provided with alternating extensions and recesses 2. Each extension of one of the said extremities engages a corresponding recess of the other of the said extremities. Each extension is provided with a tubing section (not shown) in order that tubing sections of

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successive extensions form a across the width of the band a channel 15 for receiving a means (not shown) for connecting the said extremities of the band 5.

Figure 4 shows a portion of a flexible track 1 according to
5 the invention, comprising a flexible band of an elastomeric material 5 having guiding wings 4 and tractions ribs 10 disposed at the inner face of the band 5 which is aimed at contacting wheels of a vehicle on which the track is to be mounted. Shown on the figure is an extremity of the band 5 provided with alternating extensions and recesses 2, each of the said
10 extensions having a hole 14 delimited therein in cross direction of the length of the band for forming a passage for receiving a means 13 for connecting the extremities of the band 5 when the track is mounted on wheels of a vehicle, the said means 13 consisting in a rigid elongated element.

CLAIMS

5 1. Flexible track (1) for converting a wheeled vehicle into a track vehicle, comprising a band of elastomeric material (5) having a first and a second extremity and reinforced with at least one flexible elongated reinforcing element (7) embedded in the band and extending along the length of the said band, the said first and second extremities
10 being respectively provided with at least one hole (14) extending in cross direction of the length of the band and forming a passage (15) for receiving a means (13) for connecting the said first extremity to the said second extremity, for forming an endless track, characterised in that the at least one reinforcing element (7) forms a loop around the at least one
15 hole (14) at each of the said first and second extremities of the band.

 2. Flexible track (1) according to claim 1, characterised in that the band comprises opposed first and second lateral longitudinal sides and in that each reinforcing element (7) extends continuously from one lateral side of the said band to the opposite lateral side of the said
20 band in making alternate loops around each said hole of each of the first and second extremities of the said band.

 3. Flexible track (1) according to anyone of the preceding claims, characterised in that each reinforcing element (7) comprises a first and a second extremity, each of the latter being secured to the said
25 reinforcing element to form one said loop.

 4. Flexible track (1) according to anyone of the preceding claims, characterised in that each reinforcing element (7) comprises at least one metal or textile cord or strip.

 5. Flexible track (1) according to claim 4, characterised in
30 that each reinforcing element (7) is composed of a steelcord strip (16) embedded in an elastomeric material coating (17).

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6. Flexible track (1) according to anyone of the preceding claims, characterised in that the said first and second extremity of the band of elastomeric material (5) is provided with alternating extensions and recesses (2), each extension being provided with at least one said
5 hole (14), each extension of the first extremity being aimed at engaging a corresponding recess of the second extremity and each extension of the second extremity being aimed at engaging a corresponding recess of the first extremity, for forming across the width of the band, a passage (15) with a plurality of successive holes for receiving the said means (13) for
10 connecting the said first and second extremities of the band.

7. Flexible track (1) according to anyone of the preceding claims, characterised in that each said hole (14) is provided with a rigid tubing section (9).

8. Flexible track (1) according to anyone of the preceding
15 claims, characterised in that the said means (13) for connecting the said first and second extremities of the band comprises at least one rigid or flexible elongated member having a length corresponding to the width of the said band and having a cross section adapted for passing through each said hole (14).

20 9. Flexible track (1) according to anyone of the preceding claims, characterised in that the said band of elastomeric material (5) further comprises rigid or flexible reinforcing elements (11) disposed across the length of the band.

25 10. Flexible track (1) according to anyone of the preceding claims, characterised in that it further comprises at least one intermediary piece being removably connectible to the said first and second extremities of the band in view of modifying the length of the track.

30 11. Flexible track (1) according to anyone of the preceding claims, characterised in that the inner face of the said band aimed at contacting the said wheels of a vehicle is provided with traction ribs (10)

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disposed so as to engage corresponding recesses in the said vehicle wheels.

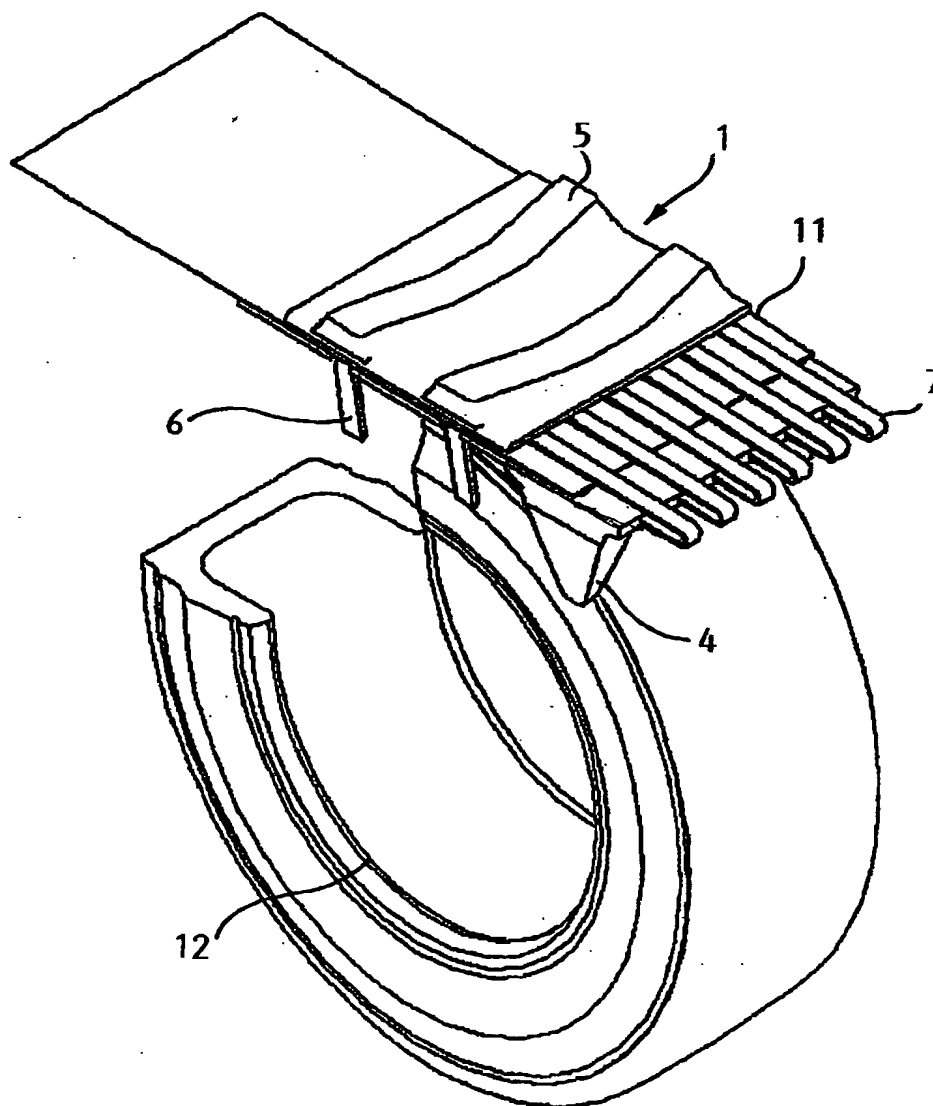
12.Flexible track (1) according to anyone of the preceding claims, characterised in that it further comprises a plurality of guiding wings (4) disposed at a distance from each other along the said first and second lateral sides of the said band and protruding from the latter so as forming a channel aimed at engaging lateral sides of the said vehicle wheels.

13.Flexible track (1) according to claim 12, characterised in that said guiding wings (4) are arranged to exert a clamping force on the lateral sides of the said vehicle wheels.

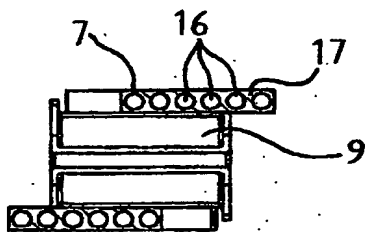
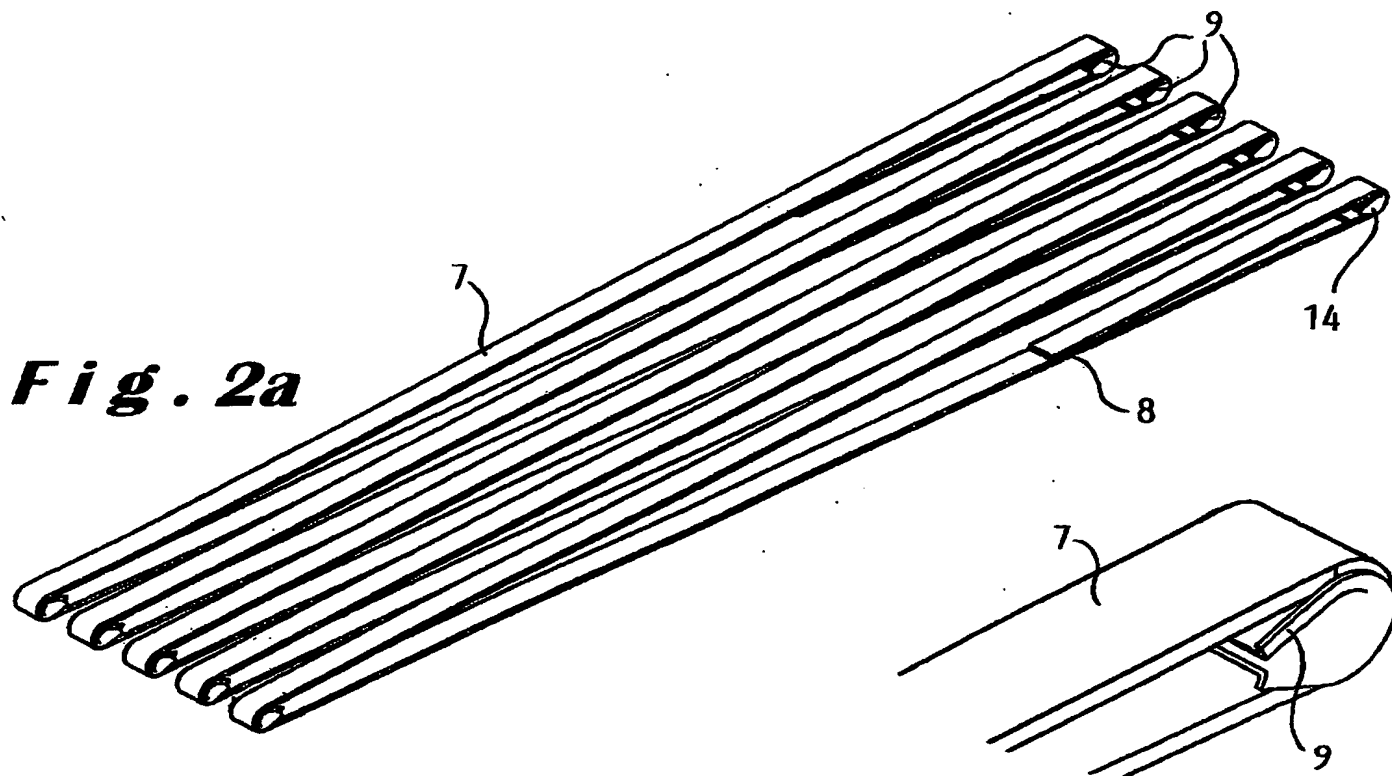
14.Flexible track (1) according to anyone of claims 12-13, characterised in that said guiding wings (4) are reinforced with a rigid core.

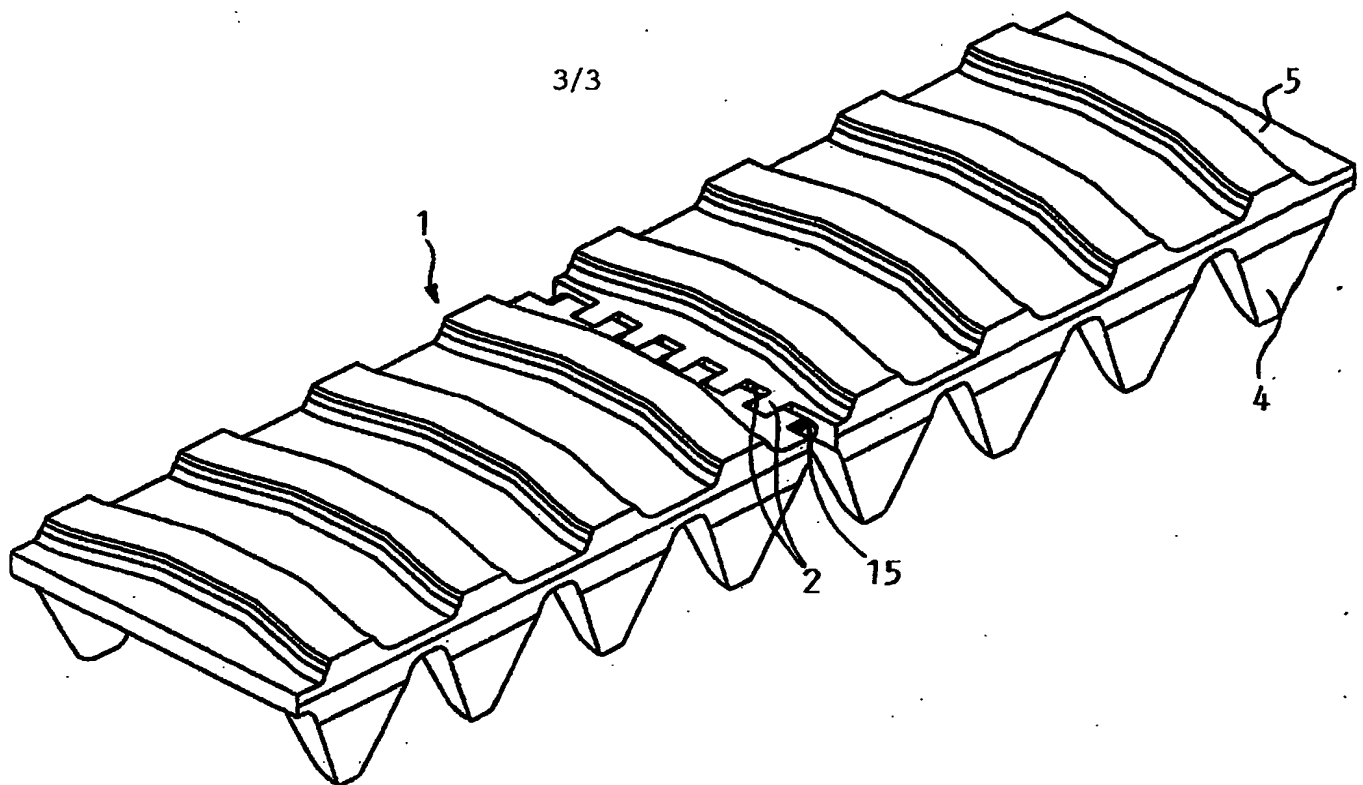
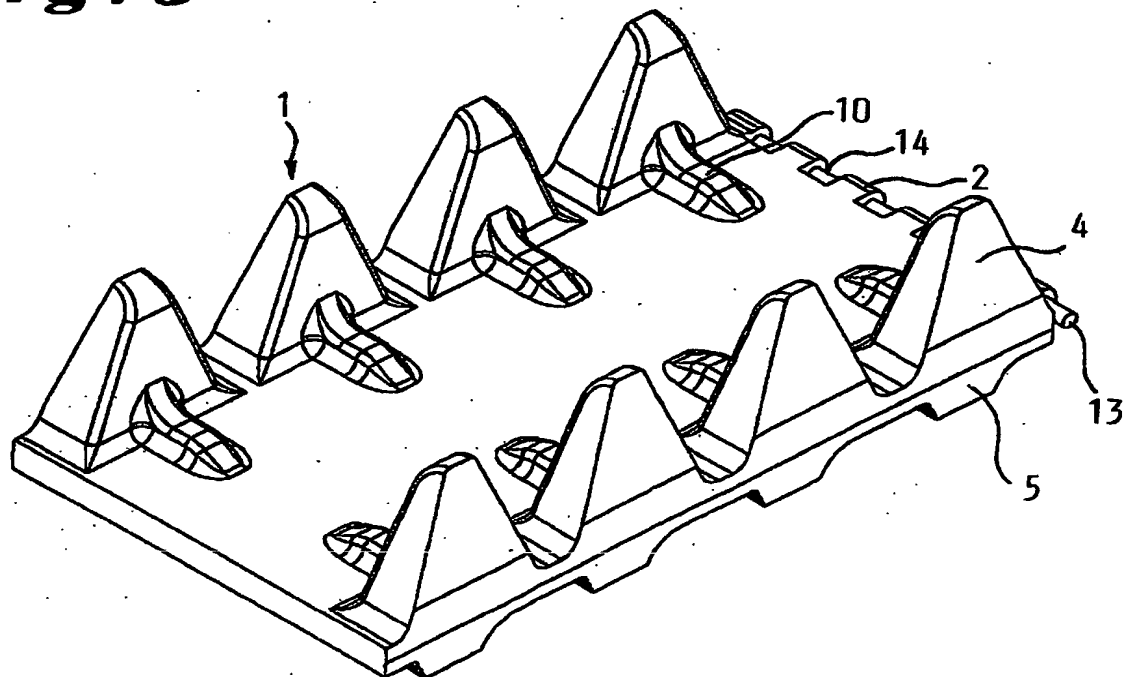
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1/3

**Fig. 1**

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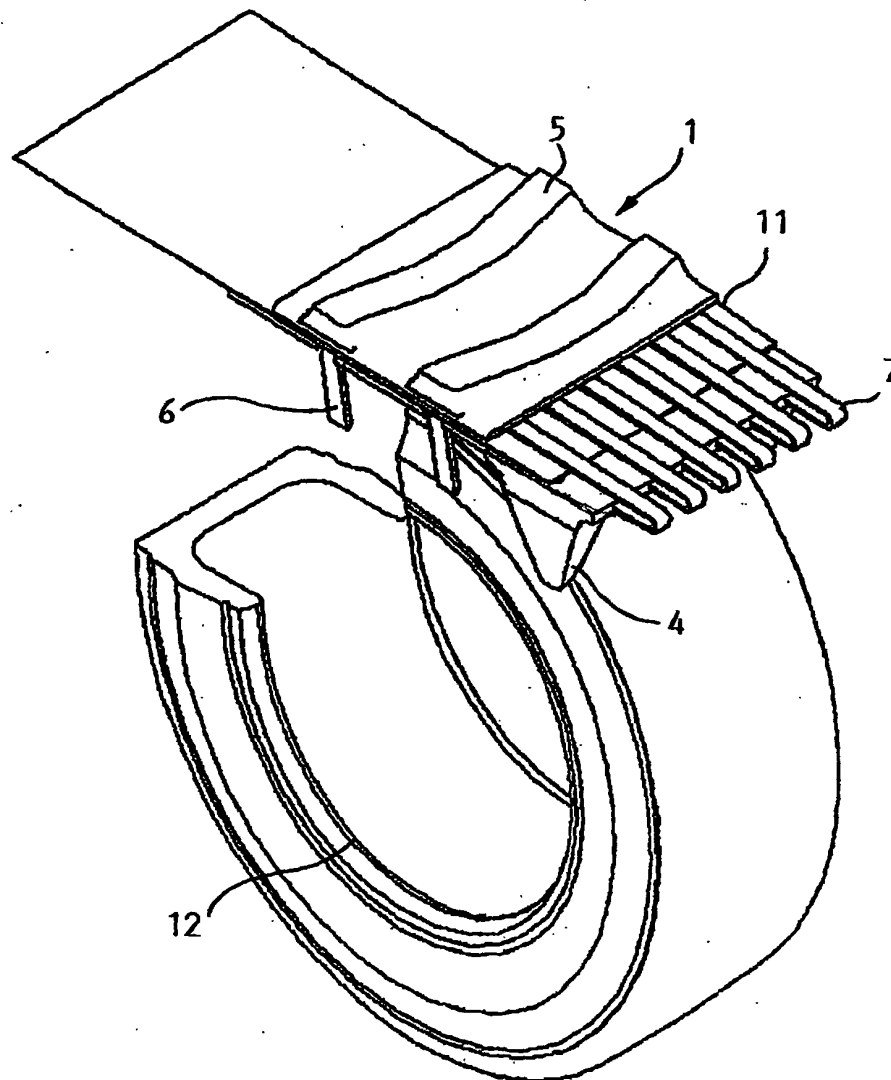
**Fig. 3****Fig. 4**

ABSTRACT**"TYRE TRACK"**

Flexible track (1) for converting a wheeled vehicle into a track vehicle. The track comprises a band of elastomeric material (5) reinforced with at least one flexible elongated reinforcing element (7) embedded in the band and extending along the length of the said band, the extremities of
5 the track are respectively provided with at least one hole (14) extending in cross direction of the length of the band and forming a passage (15) for receiving a means (13) for connecting the said extremities, for forming an endless track. The at least one reinforcing element (7) forms a loop around the at least one hole (14) at each of the extremities of the band.
10 The tension stresses endured at the junction of the extremities of the track in operation on the vehicle wheels will be absorbed by the flexible elongated reinforcing element thus avoiding formation of cracks in the band of elastomeric material at the sides of the passage receiving the means for connecting the extremities of the said band.

15

Figure *1*.

**Fig. 1**